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*Grace Tsang*  
Y. Grace Tsang  
Date: February 27, 2003

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of )

RASHMI K. SHAH )

Serial No. 09/168,770 )

Filed October 8, 1998 )

FLAMELESS COMBUSTOR PROCESS )  
HEATER )

Group Art: 1764

Examiner: Basia A. Ridley

February 27, 2003

ASSISTANT COMMISSIONER FOR PATENTS  
Washington, DC 20231

Sir:

**RESPONSE AFTER FINAL REJECTION**

The following amendments and remarks are responsive to the Office Action mailed January 2, 2003, in the prosecution of the above-identified patent application. Reconsideration of application in light of these amendments and remarks is respectfully requested.

**AMENDMENTS**

Please amend the claims as indicated below. A marked up copy of the amended claims is attached.

1. (Four times amended) A process heater for high temperature reactions comprising:

an oxidation chamber, the oxidation chamber having an inlet for an oxidant, an outlet for combustion products, and a flow path between the inlet and the outlet;

a fuel conduit for transporting a fuel to the oxidation chamber, the fuel conduit containing a plurality of fuel nozzles along substantially the entire length of the oxidation chamber, each nozzle providing fluid communication from within the fuel conduit to the oxidation chamber, the fuel nozzles being spaced so that the fuel is added to the oxidation chamber at a rate that no flame results when the fuel is mixed with the oxidant flowing through the flow path in the oxidation chamber;

a preheater in fluid communication with the oxidation chamber inlet, the preheater capable of preheating said oxidant to a temperature at which when said oxidant and the fuel are mixed in said oxidation chamber, the temperature of said mixture of oxidant and fuel exceeds the autoignition temperature of said mixture; and

a process chamber in a heat exchange relationship with the oxidation chamber whereby a controllable heat flux is provided to the process chamber at a sufficiently high rate to complete the process being conducted therein, and the heat transferred from the oxidation chamber to the process chamber does not cause the temperature of the mixture of the oxidant and the fuel within the

oxidation chamber to decrease below the autoignition temperature of said mixture of the oxidant and the fuel in the oxidation chamber.

18. (Twice Amended) A flameless distributed combustion process heater for high temperature reactions comprising:

- an oxidation chamber, said oxidation chamber having an inlet for oxidant and an outlet for combustion products, and a flow path between said inlet and outlet;

- a fuel conduit for transporting fuel into said oxidation chamber, said fuel conduit containing a plurality of fuel nozzles distributed along substantially the entire length of said oxidation chamber, said fuel nozzles being spaced so that the flow of said fuel through said fuel nozzles results in no flame when the fuel passes through the nozzles and is mixed with said oxidant flowing through said flow path in said oxidation chamber;

- a preheater in fluid communication with said oxidation chamber, for preheating said oxidant to above a temperature at which when said oxidant and said fuel are mixed in said oxidation chamber, the temperature of said mixture of said oxidant and said fuel exceeds the autoignition temperature of said mixture; and

- a process chamber in heat exchange relationship with said oxidation chamber, said plurality of nozzles distributed along substantially the entire length of said oxidation chamber being sized to provide the desired temperature distribution within said process chamber and the heat flux necessary to complete the process being conducted therein.